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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/477,688	01/06/2000	STEPHEN ANTHONY EDWARDS	1000/5	9589

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EXAMINER

ALI, SYED J

ART UNIT PAPER NUMBER

2127

DATE MAILED: 03/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/477,688

Applicant(s)

EDWARDS, STEPHEN ANTHONY

Examiner

Syed J Ali

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Information Disclosure Statement***

1. The information disclosure statement filed on January 31, 2002 does not appear to be related to the application for which it was filed. Specifically, the information disclosure statement is related to liquid crystal displays. In addition, the inventor as well as the title referenced in the information disclosure statement does not match those of the current application. Examiner requests that Applicant indicate if this was filed for the correct case, and if so, whether it is sought to be considered. At this time, the information disclosure statement as filed is not considered.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 4, and 10-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the CCFG nodes" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the ACCFG order" in line 19. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the CCFG nodes" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation "the CCFG nodes" in line 17. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "the CCFG nodes" in line 26. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Lin (see PTO-892 for citation).

As per claim 1, Lin teaches a method performed by a data processing system having a memory, comprising the steps of:

inputting a CCFG (pg. 213, fig. 2(a-b), 3(a-b), wherein the a CCFG is interpreted to be a collection of nodes and edges indicating program flow control distributed among a plurality of threads, and the figures in Lin depict two processes running in parallel, as claimed);

inputting an order of the CCFG nodes (pg. 213, fig. 2(a, b), 3(a, b), wherein the order of the CCFG nodes is determined by mapping each leaf to a state and corresponding transition, similar to that of a finite state automata); and

translating the CCFG into an SCFG by a process that determines context switching prior to execution of the SCFG (pg. 213, fig. 2(a-c), 3(a-c), wherein fig. 2(c) and 3(c) are translations of the parallel or concurrent processes of separately executing threads into a sequential model that establishes context switching between the two threads. Specifically, the two threads depicted as running concurrently, 2(a-b) and 3(a-b) have data dependencies between them that allow for switching between threads. The composition of the two concurrently running threads allows “previously hidden data dependencies across the processes” to be made explicit, thus determining where context switches might occur before the data-flow graph is executed).

As per claim 2, Lin teaches the method of claim 1, wherein each context switch is achieved by adding code that saves a state of a thread being suspended in a state variable and resumes another thread by performing a multiway branch on a state variable for a thread being resumed (pg. 213, fig. 2(c) and 3(c), wherein referring to figure 2(c), the transition point c2 is an exemplary instance of where a context switch may take place). For example, assume execution

began at point p1. After transition point c2, execution may continue along one of two pathways. This comprises a multiway branch. There are various ways of suspending and resuming threads, and the use of state variables is a well-known method of such in the art. The use of a state variable to indicate the status of a suspended or preempted thread is very well known and does not constitute an improvement over the prior art of Lin. One of a myriad of implementations of threads using state variables can be found in the enclosed reference, Nilsen et al. (USPN 6,081,665, col. 37, lines 60-66).

As per claim 3, Lin teaches the method of claim 1, wherein the translation of the CCFG into the SCFG produces, for each node of the CCFG, at most one corresponding node in the SCFG (pg. 213, "concurrent processes can be composed via parallel composition...[,which is] essentially a Cartesian product of the two Petri net processes along common labeled actions", wherein the combination of more than one concurrent process is translated to a single sequential process, and the graphs are joined at places where data dependencies between the concurrent processes indicate that a context switch should take place. Therefore, each node in the original concurrent graph maps to at most one node in the sequential graph, the exception being where two states coincide and would thus collapse into one. The more common occurrence is that two transitions would coincide and that would indicate where a context switch should take place, in which case the nodes map on a one-to-one basis).

As per claim 4, Lin teaches the method of claim 1, further comprising a topological sort for determining the ACCFG order (pg. 212-213, fig. 2(a-c), 3(a-c), wherein a topological sort for

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determining order of an acyclic graph is well known in the art. Based on the code on pg. 212, a graphical representation is created in figures 2(a-b). A topological sort is well known as a way of ordering nodes, such that if a transition occurs between two nodes, then based on how that transition is represented, it is known what order the nodes occur in the graph. A common way of expressing this is that if an edge exists such that  $\text{edge}(u, v)$  is in the graph and  $u$  and  $v$  are nodes in the graph, then  $u$  comes before  $v$  in the ordering of the graph.) This can be found in any number of programming guides, please reference the Boost Graph Library on the Boost C++ Library website for a specific example at [www.boost.org/libs/graph/doc/topological\\_sort.html](http://www.boost.org/libs/graph/doc/topological_sort.html).

As per claim 5, Lin teaches the method of claim 1, wherein an execution of the SCFG comprises translation of the SCFG into a programming language (pg. 213-216, §4.2, “Our software synthesis method aims to produce, as intermediate output, plain C code that retains a high degree of parallelism so that the subsequent processor-specific code generation step can produce efficient executable machine code for the target processor”, wherein it is clear that execution of the sequential data flow model results from the compilation of the expansion into C code and execution of that executable for a specific processor).

As per claim 6, Lin teaches the method of claim 5, wherein the programming language is C (see parenthetical comment regarding claim 5).

As per claim 7, Lin teaches the method of claim 1, further comprising a step of translation of the SCFG into a programming language (see parenthetical comment regarding claim 5).

As per claim 8, Lin teaches the method of claim 7, further comprising a step of executing the programming language translation of the SCFG (see parenthetical comment regarding claim 5).

As per claim 9, Lin teaches the method of claim 1, wherein an execution of the SCFG comprises interpretation of the SCFG (see parenthetical comment regarding claim 5, wherein the translation into C code and generation of an executable therein amounts to interpretation of the SCFG resulting in an execution of said SCFG).

As per claim 10, Lin teaches of a data processing system having a memory, comprising a sub-system to carry out the functionality of claim 1. It is clear from the introductory comments on pgs. 211-212 that the method described in Lin is intended for use in a computer system. Further, the method is designed for use with the C programming language (pg. 211, "the input specification is captured in a C-like programming language that has been extended"). It is clear that a sub-system would be present in the computer system capable of executing the method therein. The remainder of the limitations mirrors those of claim 1. Therefore, the rejection of claim 1 serves the basis for rejection of this claim as well.



As per claim 11, Lin discloses computer readable program code devices capable of carrying out the functions of claim 1. Specifically, Lin states on pg. 215, "the subsequent processor-specific code generation step can produce efficient executable machine code for the target processor." This clearly refers to computer readable code that can be executed on computer readable program code devices, as claimed. The remainder of the limitations mirrors those of claim 1. Therefore, the rejection of claim 1 serves the basis for rejection of this claim as well.

As per claim 12, Lin discloses a computer data signal embodied in a carrier wave and representing sequences of instructions which, when executed by a processor, carry out the functions of claim 1. Specifically, Lin states on pg. 215, "the subsequent processor-specific code generation step can produce efficient executable machine code for the target processor." This clearly refers to the method being executed on a processor, which inherently functions by interpreting instructions delivered in an electrical manner, as claimed. The remainder of the limitations mirrors those of claim 1. Therefore, the rejection of claim 1 serves the basis for rejection of this claim as well.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John A Follansbee can be reached on (703) 305-8498. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Syed Ali  
February 11, 2003

  
MAJID BANANKHAH  
PRIMARY EXAMINER